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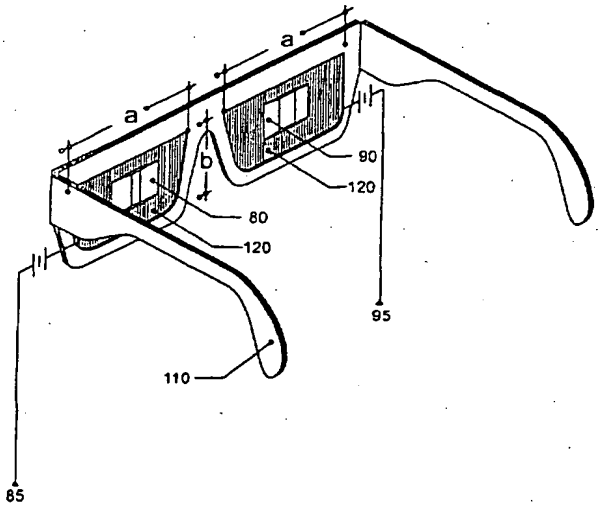
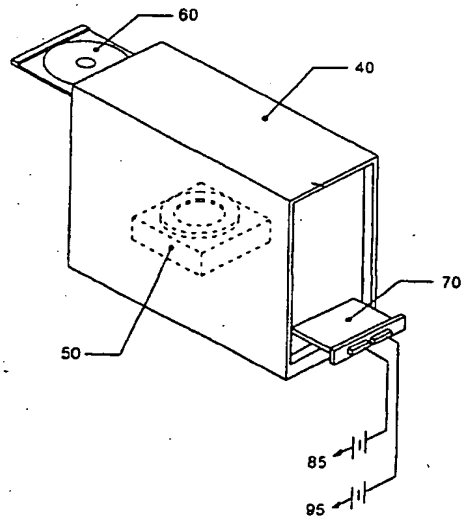
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND SYSTEM FOR STEREOSCOPIC REPRESENTATION





(57) Abstract: The invention refers in a method and a system used for stereoscopically representing a subject. According to the invention, the method records the captures the subject from two different points of view, and generates an image, which is in turn decomposed to two images and then sent to the dual output of a personal computer's graphic card.

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Method and system for stereoscopic representation

The invention refers to a method and to a system used for stereoscopically representing a subject

Generally, for the stereoscopic representation of a subject, it is required to have a) two rows of a sequence of pictures, taken at consecutive time, one from the position of the observer's left eye, and one from the observer's right eye (see **Figure 1**), and b) the appropriate equipment for their projection.

Stereoscopy is being differentiated in two modes: direct and indirect. In direct mode, every signal corresponding to an image is being directed to the appropriate display of the corresponding eye (see **Figure 2**). In indirect mode (**Figure 3**), the two signals – consisting of the images for the left and right eye – are being composed in a single image which is projected in a single screen, and the user receives the corresponding original images through a pair of glasses that perform the decomposition.

Indirect stereoscopy in turn, is being differentiated in active and passive stereoscopy. In the first one, the two signals are being swapped several times in a single second, and the user watches through the appropriate glasses each image alternately; once for the left eye and once for the right, whereas the glasses shutter each eye alternately with the same frequency. In passive stereoscopy, both signals are projected with opposite polarization (usually horizontal-vertical), and the user wears polarizing glasses to decompose the two signals in two different images.

Using the available technology in computers and projection systems, stereoscopic representation is being achieved through the projection of two signals, consisting of the images for the left and right eye. Up until

now, in personal computers, the above process has been implemented using the main output of the PC's graphics card, where the two signals carrying the two images are coming out alternately, either line by line (interlaced) or image by image (page swapped). A splitter has been used to divide the two independent images, and divert them to the appropriate display device.

According to the current invention, no splitter is required to produce the same effect, thus saving the user from buying extra hardware, which is highly priced and reduces the quality of the final resulting effect.

The invention is specified in claim 1. Claims from 2 up to 7, describe additional parameters, which lead to more benefits.

The invention, according to claim 1, turns to advantage the capability that a personal computer's operating system has, in splitting an image in several ones, in cooperation with graphics cards equipped with two separate outputs. A software application has been developed to produce a high-resolution image, which is projected in multiple vertically or horizontally tiled monitors, without stereoscopic projection though.

An example of the invention, referencing figures 1 to 5, is laid out beneath

The way of representing a stereoscopic subject is introduced in figure 1.

In figures 2 and 3, active and passive stereoscopy is presented schematically.

A personal computer required for the implementation of the invention is presented in figure 4.

Finally, the method of producing the images, according to the current invention, is schematically introduced in figure 5.

For the stereoscopic representation of a subject (10), according to the current invention, nothing more than a simple personal computer (40), a common operating system (50), a graphic card with dual display (70) and the appropriate software (60) is being required. The one and united image (100) that the specific software creates, and which comprises from the two images (80, 90) homological to images (20, 30), is driven through two signals (85, 95) in a screen (120, 150), where the user may stereoscopically observe the subject. In the case of direct stereoscopy the images are driven in two displays (120), whereas in indirect stereoscopy the images are driven in a single display (150).

With the current invention, we are able to produce both direct and indirect stereoscopy. The picture generated by the personal computer (100) using the specific software (60) is integral, with resolution 2a x b where a and b is the resolution of the right and left displays (120, 150). The image corresponding to the left eye (80), is positioned in the half left part of the total image (100), and – similarly – the image corresponding to the right eye image (90) is placed on the other (right) half part (100). Using any modern graphic card which has dual output (70), and through the appropriate configuration in the Microsoft Windows operating system (50), the original image of resolution 2a x b is split in half (85,95) and redirected to the two outputs, which send these two signals (85,95) in the corresponding projection displays (120 or 150) of a x b resolution each.

The two images (20,30) can be either naturally captured by a camera, or technically generated by a computer from a virtual solid model. In both cases, the images are packed in a single file and stored in electronic media, through a specific file protocol (format). The current invention

may be used for stereoscopic representation of sequenced image pairs of any type; static, rate filled and real timed. These pairs are either generated in a specific file format, or converted to it from commonly used video formats (e.g. avi). This allows us to create stereoscopic movie films for the cinema, either in video or DVD format. The two streams for the video may be either naturally shot using two cameras, or technically generated from virtual models in personal computers, as walkthrough animations.

Figure explanation

(10) the subject to be represented stereoscopically

(15) the spot where the two cameras capturing the subject focus/target to

(20) the picture captured from the position of the left eye

(25) the camera for the left eye

(30) the picture captured from the position of the right eye

(35) the camera for the right eye

(40) common personal computer

(50) Microsoft Windows operating system

(60) software

(70) graphic card with dual output

(80) left eye image

(85) signal of left eye image

(90) right eye image

(95) signal of right eye image

(100) The integral picture, generated by the specific software

(110) glass type dual projection system

(120) small size – high resolution monitor (one for each eye)

(130) Converge case, for system of twin projectors

(140) Projector, for computer signal output

(150) Monitor for simultaneous projection of two images

Claims

1. System for stereoscopic representation of a subject, identified by the fact that two images capturing the same subject from two different positions are being directed in two outputs of a personal computer's graphic card.

2. System for stereoscopic representation of a subject according to claim 1, identified by the fact that two images capturing the same subject from two different positions are being composed in a single image which is electronically stored, and then decomposed to the two original images, which in turn are directed in two outputs of a personal computer's graphic card.

3. System for stereoscopic representation of a subject according to claim 2, identified by the fact that the image resulting after the composition has double resolution compared to the size of the original images.

4. Software encapsulating commands, which perform one of the above (2 and 3) claims, when executed by a personal computer.

5. System for stereoscopic representation of a subject according to claims 2 to 4, identified by the fact that each of the two images comes up from the video recording of the subject.

6. System for stereoscopic representation of a subject according to claims 2 to 4, identified by the fact that each of the two images is technically generated.

7. System for stereoscopic representation of a subject according to claim 2, identified by the fact that the image composed from the original two images, is stored with the following additional information: a)

position from which the images was captured, and b) the time when the capture occurred.

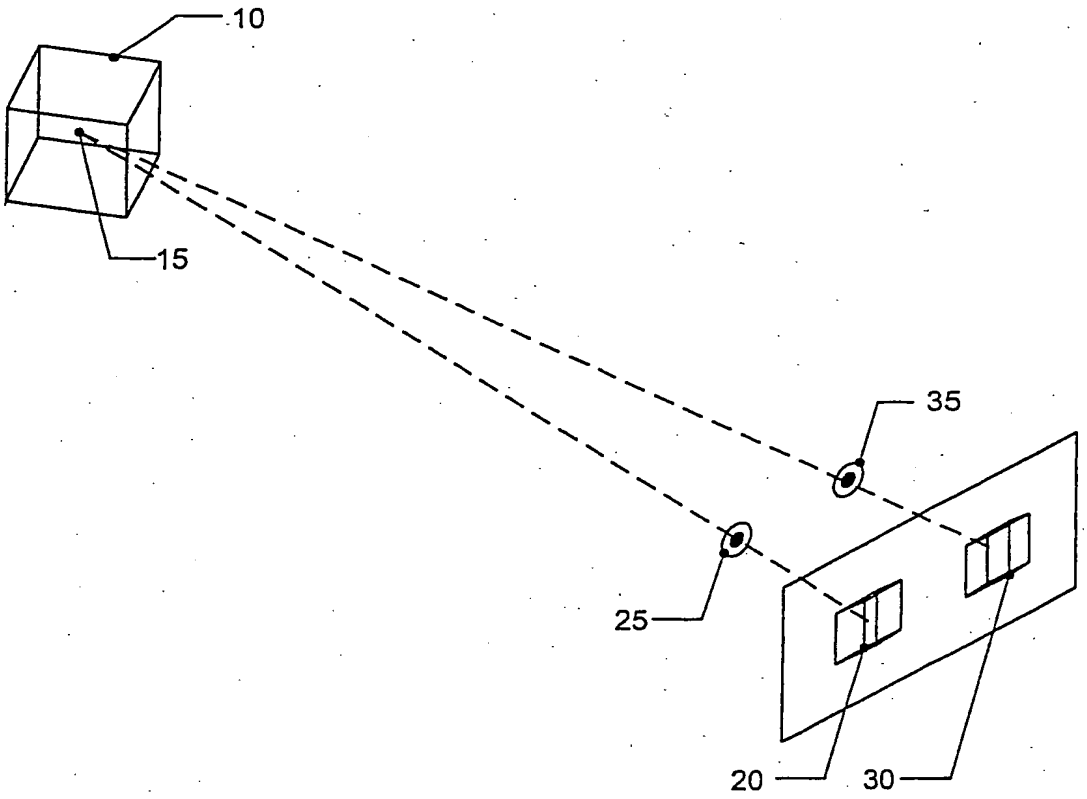

FIG. 1

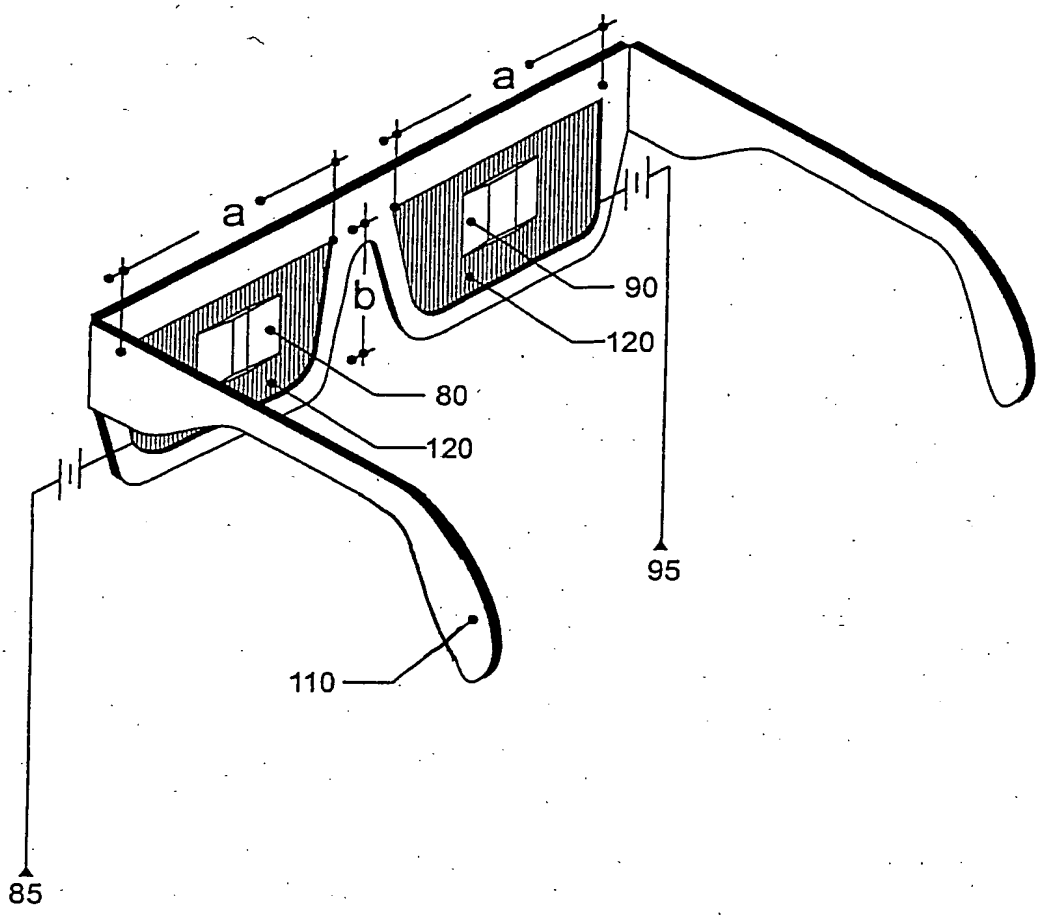

Fig. 2

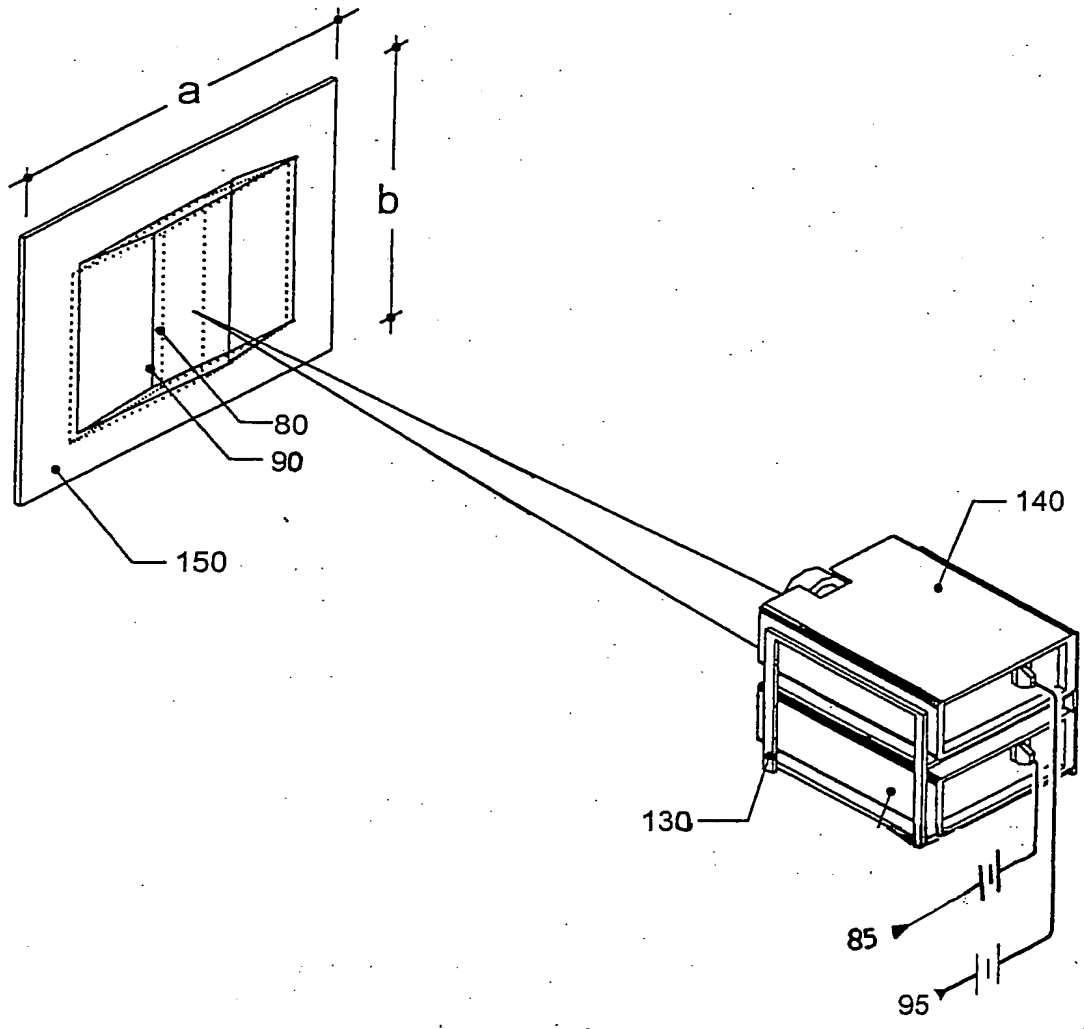

FIG. 3

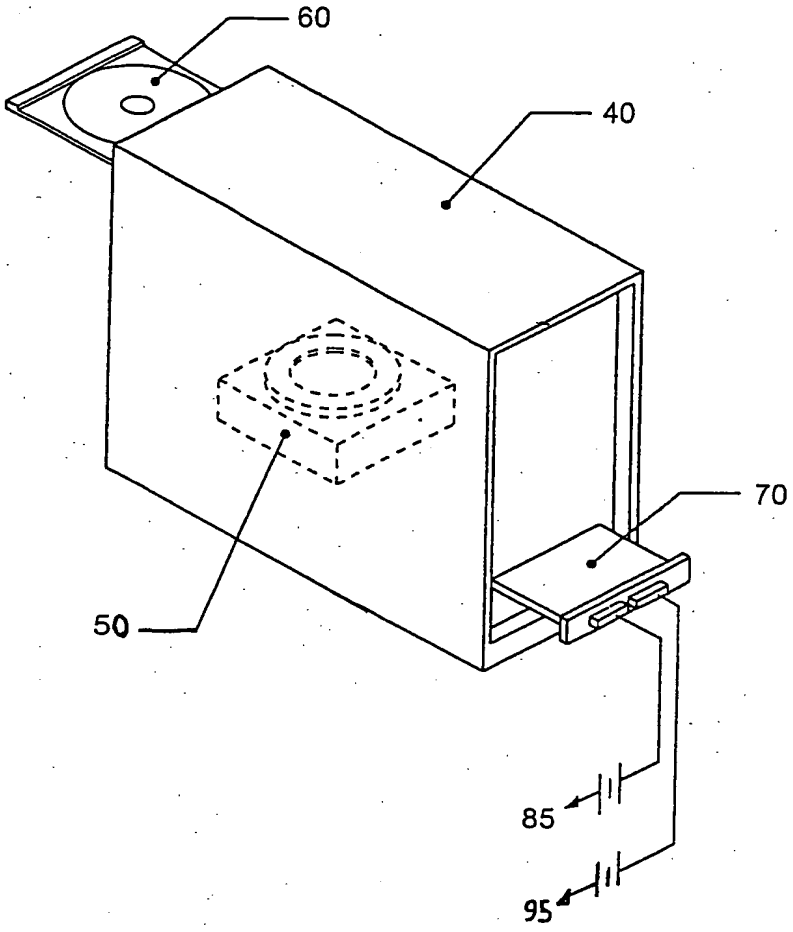

FIG. 4

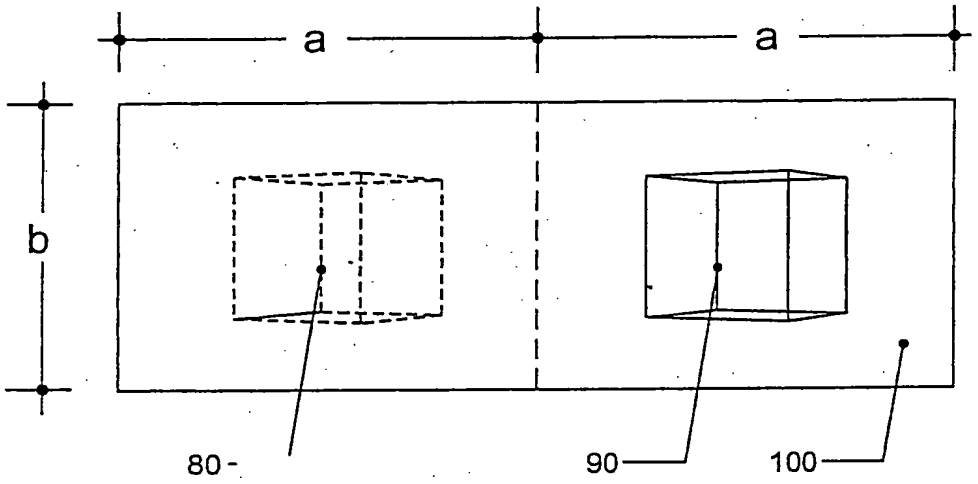

Fig. 5

INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 97531 A (SWIFT DAVID C ;SIRAGUSA JON (US); VREX INC (US); DIVELBISS ADAM W) 20 December 2001 (2001-12-20) page 5, line 21 -page 6, line 7; figure 1 page 8, line 12 - line 19; figure 2 page 14, line 7 - line 12; figure 11 page 16, line 1 - line 12; figure 14	1-6
X	US 5 193 000 A (LIPTON LENNY ET AL) 9 March 1993 (1993-03-09) column 5, line 36 - line 48 column 10, line 13 - line 34; figure 4 figures 2,8,15A,15B	1-6

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 September 2003	29/09/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	De Paepe, W

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0197531 A	20-12-2001	AU 6686201 A	24-12-2001
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